PATENT ABSTRACTS OF JAPAN

(11)Publication number : 05-325605
(43)Date of publication of application : 10.12.1993

(51)Int.Cl. F21M 7/00
G02F 1/13
G03B 21/14
G03B 33/12
// F21M 1/00

(21)Application number : 04-130445
(22)Date of filing : 22.05.1992

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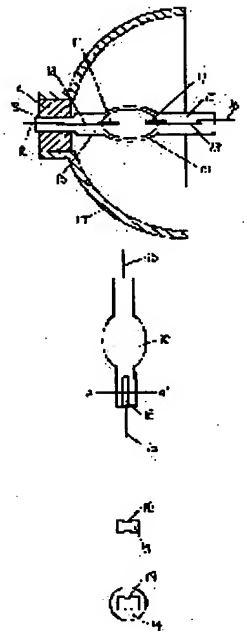
(54) METALLIC VAPOR DISCHARGE LAMP

(57)Abstract:
PURPOSE: To prevent the temperature rise of a seal section and a reflecting mirror and extend its life by providing a good heat conductor having a projection coupled with an arc tube between the arc tube and the reflecting mirror.
CONSTITUTION: A heat conductor 14 made of stainless steel is provided between a metallic vapor discharge arc tube 10 and a reflecting mirror 17, the projection 19 of the heat conductor 14 is coupled with the recess 8 of the metallic vapor discharge arc tube 10, and the metallic vapor discharge arc tube 10 and the heat conductor 14 are closely fixed together. The reflecting mirror 17, the metallic vapor discharge arc tube 10, and the heat conductor 14 are further fixed to form a metallic vapor discharge lamp. The reflecting mirror 17 is coated with a multi-layer interference film on its surface, infrared rays and ultraviolet rays radiated from the metallic vapor discharge arc tube 10 are cut, and only the visible light is reflected. The heat at the tip of an electrode seal section is effectively released to the heat conductor 14, the temperature at the tip of the electrode seal section and the reflecting mirror 17 is lowered, and the oxidation of a molybdenum external lead wire 16 and the crack of the reflecting mirror 17 are prevented.



LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

(19)日本国特許庁（ＪＰ）　(12) **公開特許公報**（Ａ）　(11)特許出願公開番号

特開平5－325605

(43)公開日　平成５年(1993)12月10日

(51)Int.Cl.[5]	識別記号	庁内整理番号	ＦＩ	技術表示箇所
Ｆ２１Ｍ　7/00		Ｊ　9249－3Ｋ		
Ｇ０２Ｆ　1/13	５０５	7348－2Ｋ		
Ｇ０３Ｂ　21/14		Ａ　7316－2Ｋ		
33/12		7316－2Ｋ		
// Ｆ２１Ｍ　1/00		Ｋ　9249－3Ｋ		

審査請求　未請求　請求項の数３(全　６　頁)

(21)出願番号　特願平4－130445

(22)出願日　平成４年(1992)５月22日

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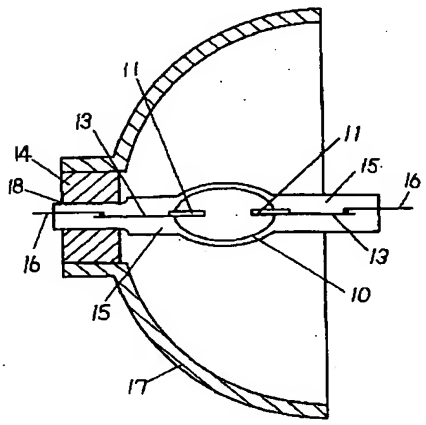
(54)【発明の名称】　金属蒸気放電灯

(57)【要約】

【目的】　金属蒸気放電灯において、発光管と嵌合する凸部を有した良熱伝導体を設けることにより、封止部と反射鏡の温度上昇を防止して、長寿命化する。

【構成】　反射鏡と金属蒸気放電発光管との間に発光管と嵌合する凸部を有した良熱伝導体を設けた金属蒸気放電灯。

10　金属蒸気放電発光管
11　タングステン電極
13　Mo箔
14　伝熱体
15　ピンチシール部
16　外部リード線
17　反射鏡
18　凹部



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【特許請求の範囲】

【請求項１】封止部に凹部を有した金属蒸気放電発光管と、多層干渉膜のコーティングした反射鏡との間に、金属蒸気放電発光管に密着固定しかつ前記凹部と嵌合する凸部を有した良熱伝導体からなる伝熱体を設けたことを特徴とする金属蒸気放電灯。

【請求項２】封止部に凹部を有した金属蒸気放電発光管と、多層干渉膜のコーティングした反射鏡との間に、金属蒸気放電発光管に密着固定しかつ前記凹部と嵌合する凸部と、少なくとも放熱用フィン及び通気孔のいずれか一つを設けた良熱伝導体からなる伝熱体を設けたことを特徴とする金属蒸気放電灯。

【請求項３】少なくとも、請求項１及び請求項２記載の金属蒸気放電灯と、ダイクロイックミラーと、液晶ライトバルブと、投写レンズと、コンデンサーレンズと、スクリーンとからなることを特徴とする投写型ディスプレー。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は、高効率、高演色性、長寿命の金属蒸気放電灯、投写型ディスプレーに関する。

【０００２】

【従来の技術】近年、ＣＲＴ（CATHOD RAY TUBE、陰極線管）にかわる大画面のディスプレイとして、種々のものが提案されているが、大表示容量でカラー表示ができる大画面のディスプレイとして、各画素ごとに薄膜トランジスター（ＴＦＴ）を形成したアクティブマトリックス方式の液晶パネルを投写型ディスプレイに応用する方式がとりわけ注目されている。

【０００３】このようなディスプレイではとりわけ光源がキーデバイスであるが、発光効率、演色性等の点から金属ハロゲン化物を封入した金属蒸気放電灯が優れている。金属ハロゲン化物の充分な発光を得るためには、高い管壁温度が必要であり点灯時の発光管温度は１０００℃近くに、また電極封止部先端においても４００℃近くに達する。このため電極封止部においてモリブデンのリード線が酸化して断線したり、反射鏡が割れるなどの問題があり、金属蒸気放電灯の寿命が短かった。

【０００４】このことを解決するために、送風手段によって発光管に送風して発光管温度を調節する方法（例えば特開平４－３２１５３号公報）が提案されている。

【０００５】

【発明が解決しようとする課題】しかしながら、これらの冷却手段は、送風手段を新たに金属蒸気放電灯に設ける必要がある、またコストアップになるという問題があった。

【０００６】

【課題を解決するための手段】この目的を達成するために本発明は、金属蒸気放電灯として、封止部に凹部を有した金属蒸気放電発光管と、多層干渉膜のコーティング

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した反射鏡との間に、金属蒸気放電発光管に密着固定しかつ前記凹部と嵌合する凸部を有した良熱伝導体からなる伝熱体を設けたことを特徴とするものである。

【０００７】

【作用】点灯中の発光管は、電極封止部先端においても４００℃近くに達するが、発光管と反射鏡とを良熱伝導体からなる伝熱体を介して密着固定することによって電極封止部先端の熱を伝熱体に逃がし、電極封止部先端及び反射鏡の温度を下げ、モリブデンのリード線の酸化や反射鏡の割れを防止することができる。伝熱体はこの凹部に嵌合しかつ電極封止部に密着するように加工し、伝熱体の材料０００としては、熱伝導率が３$W \cdot m^{-1} \cdot K^{-1}$より大きいものが本発明の効果が大きく、例えばステンレス鋼、炭素鋼、真鍮、モリブデン、タングステン、銅、グラファイト、アルミナなどが好ましい。またこれらの伝熱体の熱膨張係数は電極封止部の石英ガラスのそれより大きいので、金属蒸気放電発光管の点灯時は伝熱体がより膨張して隙間ができるが、本願発明のように伝熱体に凸部、及び電極封止部に凹部を設けることによって高温時に金属蒸気放電発光管と伝熱体とがより密着して放熱が増すという効果がある。その結果電極封止部先端の熱を効果的に伝熱体に逃がし、電極封止部先端及び反射鏡の温度を下げ、モリブデンのリード線の酸化や反射鏡の割れを防止することができる。

【０００８】したがって本発明により、長時間発光管を点灯させても明るい画面、高い表示品質を長時間維持した投写型ディスプレーが可能となる。

【０００９】

【実施例】

（実施例１）図１は本発明の金属蒸気放電灯の一実施例を示す断面図であり、１０は金属蒸気放電発光管、１１はタングステン電極、１３はＭｏ箔、１４は金属蒸気放電発光管に固定密着した伝熱体、１５は反射鏡を密閉するピンチシール部、１６は外部リード線、１７は多層干渉膜（不図示）をコーティングした反射鏡、１８は凹部である。

【００１０】まず、本発明の実施例における金属蒸気放電発光管の製造方法を示す。石英ガラスからなるガラス管（内径１０㎜、厚み２㎜）の内部に不活性ガスをフローしながら、プロパン一酸素炎で約５０秒火炎加工し、金型で所定の形状の管体にした。

【００１１】このようにして得られたガラス管体にタングステン電極１１とＭｏ箔１３からなる電極をはさんだ状態で、凹部１８を形成できるように加工した金型でピンチシールを行なった。その中にヨウ化ネオジウム（NdI_3）３．０mg、ヨウ化デスプロシウム（DyI_3）６．０mg、ヨウ化セシウム（ＣｓＩ）６．０mg、水銀（Ｈｇ）４０mgをアルゴンガスとともに封入し、チップシール部（不図示）でチップシールして図１に示した金属蒸気放電発光管１０を完成させた。このように作製し

た金属蒸気放電発光管１０の点灯試験を行なうと、ランプ電圧が９５Ｖ、ランプ電流が２．６Ａであった。

【００１２】図２（ａ）は本発明の金属蒸気放電発光管の一実施例を示す模式図、（ｂ）は金属蒸気放電発光管の断面ＡＡ’を示す断面図、（ｃ）は金属蒸気放電発光管に嵌合する伝熱体１４を示す模式図であり、１９は伝熱体１４の凸部である。ピンチシール部１３では（ｂ）のようにＭｏ箔１３と平行になるように凹部１８を形成し、この凹部１８に嵌合しかつピンチシール部に密着するようにステンレス鋼からなる伝熱体１４を（ｃ）に示した形状に加工した。

【００１３】金属蒸気放電発光管１０の凹部１８と伝熱体１４の凸部１９とを嵌合させて金属蒸気放電発光管１０と伝熱体１４とを固定密着させた。反射鏡１７と金属蒸気放電発光管１０と伝熱体１４とをさらに固定して、図１のような金属蒸気放電発光管１０を反射鏡に組み込んだ金属蒸気放電灯を作製した。なお反射鏡１７は、回転放物面の形状でガラス製の反射鏡の表面に多層干渉膜（不図示）をコーティングして、金属蒸気放電発光管１０から放射される赤外線及び紫外線をカットし、可視光のみ反射させた。

【００１４】金属蒸気放電発光管１０は、アーク長７㎜で垂直に点灯させた。試作した金属蒸気放電灯を点灯周波数２５０Ｈｚの矩形波で点灯させると、いずれも全光束が約１６０００ｌｍ、色温度が約７３００Ｋであった。また金属蒸気放電発光管１０と伝熱体１４との間に熱電対を挿入して、外部リード線１６に近いピンチシール部１５の温度を測定した結果、約３５０℃であった。そして本発明の金属蒸気放電灯を１００００時間点灯した後においても、モリブデンの外部リード線１６の酸化や反射鏡の割れは起こっていなかった。一方、比較例として同様の金属蒸気放電発光管１０をセメントだけで反射鏡１７に固着させた場合、外部リード線１６に近いピンチシール部１５の温度は約４００℃あった。そして７０００時間で反射鏡１７に割れが発生し、８０００時間でモリブデンの外部リード線１６が酸化して断線した。

【００１５】図３は本発明の実施例における投写型ディスプレイを示す模式図である。本発明の金属蒸気放電灯からなる光源２１の光線２２はコリメータレンズ２３で集光され、ダイクロイックミラー２４により青（Ｂ）、緑（Ｇ）、赤（Ｒ）の３色に分離してそれぞれの液晶ライトバルブ２５に入射させた。３枚の液晶ライトバルブ２５から得られたＢＧＲの画像をそれぞれ３本の広角の投写レンズ２６を用いてスクリーン２７上で合成してフルカラーの映像を得た。本発明の金属蒸気放電灯を組み込んだ投写型ディスプレイの場合、スクリーン輝度はいずれも２４０ｆｔ－Ｌであり、また１００００時間後においてもリード線の酸化や反射鏡の割れのない、明るい画面、高い表示品質を長時間維持した投写型ディスプレーが可能となった。

【００１６】（実施例２）高珪酸ガラスからなるガラス管（内径１０㎜、厚み２㎜）の内部に不活性ガスをフローしながら、水素一酸素炎で約２０秒火炎加工し、金型で所定の形状の管体にした。

【００１７】このようにして得られたガラス管体にタングステン製電極をはさんだ状態で封じた。その中にヨウ化ナトリウム（ＮａＩ）１０ｍｇ、ヨウ化タリウム（ＴｌＩ）１ｍｇ、ヨウ化インジウム（ＩｎＩ）０．６ｍｇ、水銀（Ｈｇ）５０ｍｇをアルゴンガスとともに封入し、チップシール部（不図示）でチップシールして図３に示した金属蒸気放電発光管１０を完成させた。このように作製した金属蒸気放電発光管の点灯試験を行なうと、ランプ電圧が１０５Ｖ、ランプ電流が２．３８Ａであった。

【００１８】図４（ａ）は本発明の金属蒸気放電発光管の一実施例を示す模式図、（ｂ）は金属蒸気放電発光管の断面ＢＢ’を示す断面図、（ｃ）は金属蒸気放電発光管の電極封着部に嵌合する伝熱体１４を示す模式図であり、１９は伝熱体１４の凸部であり、電極封着部の凹部１８に嵌合する。電極封着部の凹部はＭｏ箔に直交するように（電極封着部の側面に相当する）ピンチシールして、凹部１８を形成し、伝熱体１４としては、アルミナを用いた。

【００１９】金属蒸気放電発光管１０の凹部１８と伝熱体１４の凸部１９とを嵌合させて金属蒸気放電発光管１０と伝熱体１４とを固定密着させた。反射鏡１７と伝熱体１４とをネジで固定して、図３のような金属蒸気放電発光管１０を反射鏡に組み込んだ金属蒸気放電灯を作製した。なお反射鏡１７は、実施例１と同様のものを用いた。

【００２０】なお金属蒸気放電発光管１０は、アーク長７㎜で垂直に点灯させた。試作した金属蒸気放電灯を点灯周波数２５０Ｈｚの矩形波で点灯させると、いずれも全光束が２３０００ｌｍ、色温度が約５１００Ｋであり、また金属蒸気放電発光管１０と伝熱体１４との間に熱電対を挿入して、外部リード線１６に近いピンチシール部１５の温度を測定した結果、約３６０℃であった。そして本発明の金属蒸気放電灯を１００００時間点灯した後においても、モリブデンの外部リード線１６の酸化や反射鏡の割れは起こっていなかった。一方比較例として同様の金属蒸気放電発光管１０をセメントだけで反射鏡１７に固着させた場合、外部リード線１６に近いピンチシール部１５の温度は約４００℃あった。そして７５００時間で反射鏡１７に割れが発生し、８３００時間でモリブデンの外部リード線１６が酸化して断線した。

【００２１】実施例１と同様に投写型ディスプレイに本発明の金属蒸気放電灯を組み込んだ。本発明の金属蒸気放電灯を組み込んだ投写型ディスプレイの場合、スクリーン輝度はいずれも２３０ｆｔ－Ｌであり、また１００００時間後においてもリード線の酸化や反射鏡の割れのない、明るい画面、高い表示品質を長時間維持した投写

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型ディスプレーが可能となった。

【００２２】（実施例３）実施例２と同様の金属蒸気放電発光管１０と反射鏡１７を用いた。金属蒸気放電発光管の電極封着部に嵌合する伝熱体１４には、放熱用フィン１４ａを設け、材質として真鍮を用いた。

【００２３】金属蒸気放電発光管１０の凹部１８と伝熱体１４の凸部１９とを嵌合させて金属蒸気放電発光管１０と伝熱体１４とを固定密着させた。反射鏡１７と伝熱体１４とをセメントで固定して、図５のような金属蒸気放電発光管１０を反射鏡に組み込んだ金属蒸気放電灯を作製した。実施例２と同様の条件で点灯すると、金属蒸気放電発光管１０と伝熱体１４との間に熱電対を挿入して、外部リード線１６に近いピンチシール部１５の温度を測定した結果、約３３０℃であった。そして本発明の金属蒸気放電灯を１００００時間点灯した後においても、モリブデンの外部リード線１６の酸化や反射鏡の割れは起こっていなかった。

【００２４】実施例１と同様に投写型ディスプレイに本発明の金属蒸気放電灯を組み込んだ。本発明の金属蒸気放電灯を組み込んだ投写型ディスプレイの場合、スクリーン輝度はいずれも２３０ｆｔ－Ｌであり、また１００００時間後においてもリード線の酸化や反射鏡の割れのない、明るい画面、高い表示品質を長時間維持した投写型ディスプレーが可能となった。

【００２５】（実施例４）実施例２と同様の金属蒸気放電発光管１０と反射鏡１７を用いた。金属蒸気放電発光管の電極封着部に嵌合する伝熱体１４には、通気孔１４ｂを設け、材質としてニッケルを用いた。

【００２６】金属蒸気放電発光管１０の凹部１８と伝熱体１４の凸部１９とを嵌合させて金属蒸気放電発光管１０と伝熱体１４とを固定密着させた。反射鏡１７と伝熱体１４とをネジ（不図示）で固定して、図６のような金属蒸気放電発光管１０を反射鏡に組み込んだ金属蒸気放電灯を作製した。実施例２と同様の条件で点灯すると、金属蒸気放電発光管１０と伝熱体１４との間に熱電対を挿入して、外部リード線１６に近いピンチシール部１５の温度を測定した結果、約３３０℃であった。そして本発明の金属蒸気放電灯を１００００時間点灯した後においても、モリブデンの外部リード線１６の酸化や反射鏡の割れは起こっていなかった。

【００２７】実施例１と同様に投写型ディスプレイに本発明の金属蒸気放電灯を組み込んだ。本発明の金属蒸気放電灯を組み込んだ投写型ディスプレイの場合、スクリーン輝度はいずれも２３０ｆｔ－Ｌであり、また１００００時間後においてもリード線の酸化や反射鏡の割れのない、明るい画面、高い表示品質を長時間維持した投写型ディスプレーが可能となった。

【００２８】なお本発明の金属蒸気放電灯、投写型ディスプレーにおいて、金属蒸気放電発光管の形状や封入物

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や封入量、ゲッターの有無、金属蒸気放電発光管と伝熱体との反射鏡への固定方法、反射鏡への多層干渉膜のコーティングの位置、投写型ディスプレイの構成や表示原理等は、本実施例に限定されるものではない。

【００２９】

【発明の効果】以上説明したように、本発明の金属蒸気放電灯、投写型ディスプレーは、金属蒸気放電灯として、封止部に凹部を有した金属蒸気放電発光管と、多層干渉膜のコーティングした反射鏡との間に、金属蒸気放電発光管に密着固定しかつ前記凹部と嵌合する凸部を有した良熱伝導体からなる伝熱体を設けることにより、電極封止部先端の熱を効果的に伝熱体に逃がし、電極封止部先端及び反射鏡の温度を下げ、モリブデンのリード線の酸化や反射鏡の割れを防止することができる。

【００３０】したがって本発明により、長時間発光管を点灯させても明るい画面、高い表示品質を長時間維持した投写型ディスプレーが可能となる。

【図面の簡単な説明】

【図１】本発明の金属蒸気放電灯の一実施例を示す断面図

【図２】本発明の金属蒸気放電発光管及び伝熱体の一実施例を示す模式図

【図３】本発明の金属蒸気放電灯の一実施例を示す断面図

【図４】本発明の金属蒸気放電発光管及び伝熱体の一実施例を示す模式図

【図５】本発明の金属蒸気放電灯の一実施例を示す断面図

【図６】本発明の金属蒸気放電灯の一実施例を示す断面図

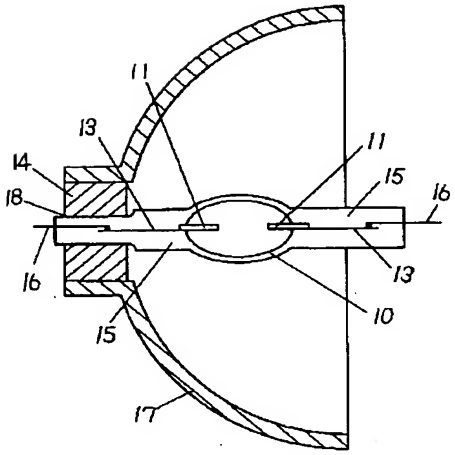
【図７】本発明の投写型ディスプレイの一実施例を示す模式図

【符号の説明】

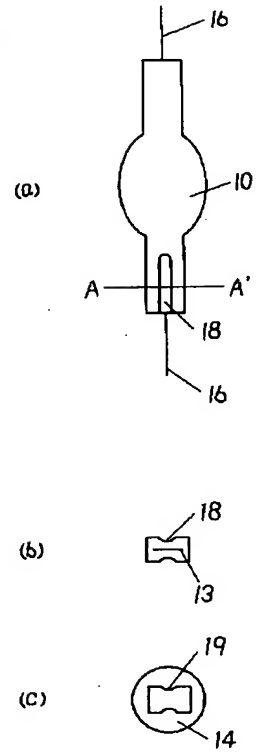
１０　金属蒸気放電発光管
１１　タングステン電極
１３　Ｍｏ箔
１４　伝熱体
１５　ピンチシール部
１６　外部リード線
１７　反射鏡
１８　凹部
１９　凸部
２１　光源
２２　光線
２３　コリメータレンズ
２４　ダイクロイックミラー
２５　液晶ライトバルブ
２６　投写レンズ
２７　スクリーン

【図１】

10 金属蒸気放電発光管
11 タングステン電極
13 Mo箔
14 伝熱体
15 ピンチシール部
16 外部リード線
17 反射鏡
18 凹部



【図２】



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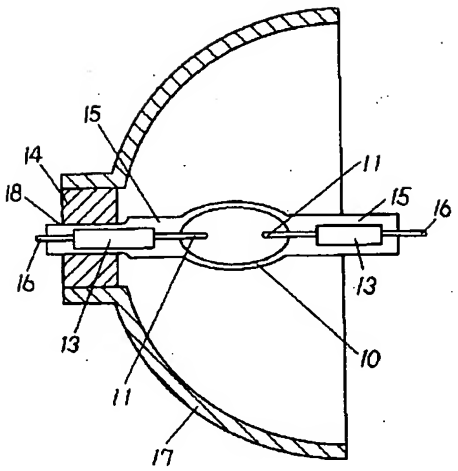

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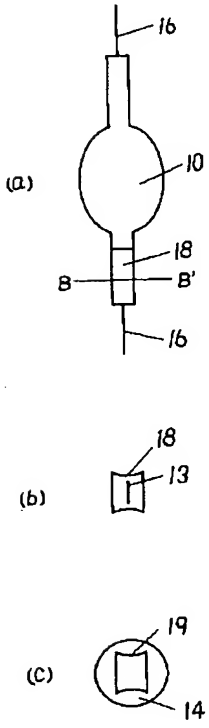

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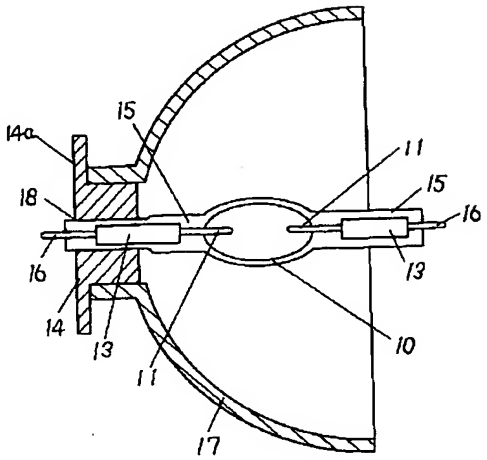

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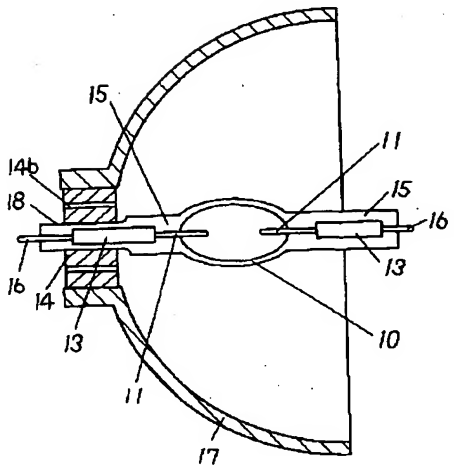
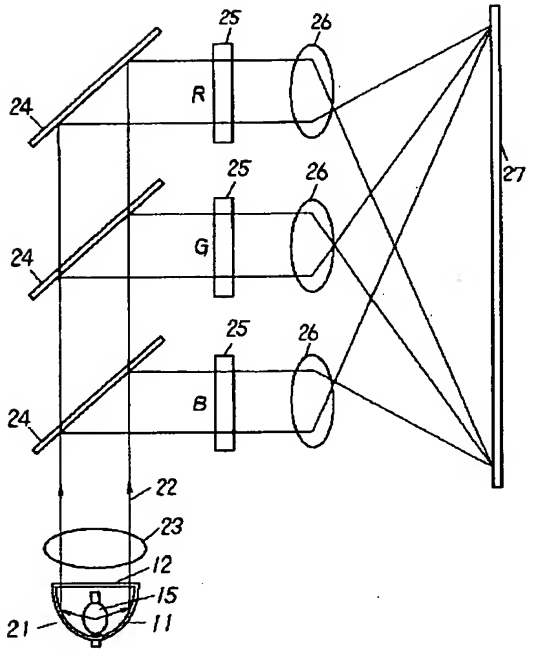


【図7】

21 光源
24 ダイクロイックミラー
25 液晶ライトバルブ
27 スクリーン



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PATENT ABSTRACTS OF JAPAN

(11)Publication number : 05-325605

(43)Date of publication of application : 10.12.1993

(51)Int.Cl. F21M 7/00
G02F 1/13
G03B 21/14
G03B 33/12
// F21M 1/00

(21)Application number : 04-130445

(22)Date of filing : 22.05.1992

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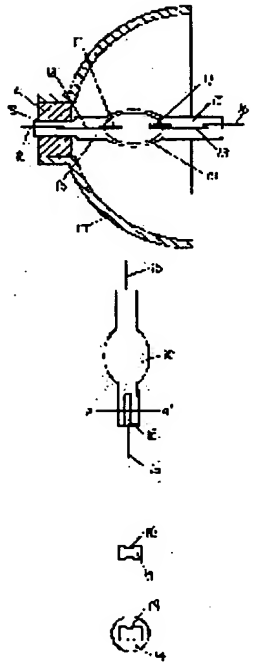
(54) METALLIC VAPOR DISCHARGE LAMP

(57)Abstract:

PURPOSE: To prevent the temperature rise of a seal section and a reflecting mirror and extend its life by providing a good heat conductor having a projection coupled with an arc tube between the arc tube and the reflecting mirror.

CONSTITUTION: A heat conductor 14 made of stainless steel is provided between a metallic vapor discharge arc tube 10 and a reflecting mirror 17, the projection 19 of the heat conductor 14 is coupled with the recess 8 of the metallic vapor discharge arc tube 10, and the metallic vapor discharge arc tube 10 and the heat conductor 14 are closely fixed together. The reflecting mirror 17, the metallic vapor discharge arc tube 10, and the heat conductor 14 are further fixed to form a metallic vapor discharge lamp. The reflecting mirror 17 is coated with a multi-layer interference film on its surface, infrared rays and ultraviolet rays radiated from the metallic vapor discharge arc tube 10 are cut, and only the visible light is reflected. The heat at the tip of an electrode seal section is effectively released to the heat conductor 14, the temperature at the tip of the electrode seal section and the reflecting mirror 17 is lowered, and the oxidation of a molybdenum external lead wire 16 and the crack of the reflecting mirror 17 are prevented.



LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

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CLAIMS

[Claim(s)]
[Claim 1] The metallic-fumes electric-discharge lamp which carries out adhesion immobilization at metallic-fumes electroluminescence tubing between the reflecting mirrors with which metallic-fumes electroluminescence tubing with a crevice and the multilayer interference film coated the closure section, and is characterized by establishing the heat transfer object which consists of a right conductor with said crevice and the heights which fit in.
[Claim 2] The metallic-fumes electric-discharge lamp which carries out adhesion immobilization at metallic-fumes electroluminescence tubing between the reflecting mirrors with which metallic-fumes electroluminescence tubing with a crevice and the multilayer interference film coated the closure section, and is characterized by establishing said crevice, the heights which fit in, and the heat transfer object which consists of a right conductor which prepared any one of the fin for heat dissipation, and the air holes at least.

[Claim 3] The projection mold display characterized by consisting of claim 1 and a metallic-fumes electric-discharge lamp according to claim 2, a dichroic mirror, a liquid crystal light valve, a projection lens, a condenser lens, and a screen at least.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to efficient, high color rendering properties, a long lasting metallic-fumes electric-discharge lamp, and a projection mold display.
[0002]
[Description of the Prior Art] Although various things are proposed in recent years as a display of a big screen which changes to CRT (CATHOD RAY TUBE, cathode-ray tube), by large display capacity, the method which applies the liquid crystal panel of the active-matrix method which formed the thin film transistor (TFT) for every pixel to a projection display as a display of the big screen whose color display is possible divides, and attracts attention.
[0003] Although it divides and the light source is a key device, the metallic-fumes electric-discharge lamp which enclosed the metal halogenide from points, such as luminous efficiency and color rendering properties, is excellent in such a display. In order to obtain sufficient luminescence of a metal halogenide, a high condensed mercury temperature is required and the arc tube temperature at the time of lighting amounts to about 1000 degrees C also in an electrode closure section tip again at about 400 degrees C. For this reason, in the electrode closure section, the lead wire of molybdenum oxidized, and it disconnected, or there were problems, like a reflecting mirror can be broken, and the life of a metallic-fumes electric-discharge lamp was short.
[0004] In order to solve this, the method (for example, JP,4-32153,A) of ventilating an arc tube and adjusting arc tube temperature with a ventilation means, is proposed.
[0005]
[Problem(s) to be Solved by the Invention] However, these cooling means newly need to form a ventilation means in a metallic-fumes electric-discharge lamp, and had the problem of becoming a cost rise.
[0006]
[Means for Solving the Problem] In order to attain this purpose, this invention carries out adhesion immobilization at metallic-fumes electroluminescence tubing between the reflecting mirrors with which metallic-fumes electroluminescence tubing with a crevice and the multilayer interference film coated the closure section as a metallic-fumes electric-discharge lamp, and is characterized by establishing the heat transfer object which consists of a right conductor with said crevice and the heights which fit in.
[0007]
[Function] Although the arc tube under lighting amounts to about 400 degrees C also in an electrode closure section tip, by carrying out adhesion immobilization of an arc tube and the reflecting mirror through the heat transfer object which consists of a right conductor, it can miss the heat at the tip of the electrode closure section on a heat transfer object, can lower the temperature of an electrode closure section tip and a reflecting mirror, and can prevent oxidation of the lead wire of molybdenum, and the crack of a reflecting mirror. It is processed so that it may fit into this crevice and may stick to the electrode closure section, and as for the effectiveness of this invention, as an ingredient 000 of a heat transfer object, what has larger thermal conductivity than 3 W-m -1-K-1 is large, for example, a heat transfer object has stainless steel, carbon steel, brass, molybdenum, a tungsten, copper, graphite, a desirable alumina, etc. Moreover, although a heat transfer object expands more and a clearance can do at the time of lighting of metallic-fumes electroluminescence tubing since the coefficient of thermal expansion of these heat transfer objects is larger than that of the quartz glass of the electrode closure section, it is effective in metallic-fumes electroluminescence tubing and a heat transfer object sticking more at the time of an elevated temperature, and heat dissipation increasing like the invention in this application, by establishing a crevice in heights and

the electrode closure section at a heat transfer object. As a result, the heat at the tip of the electrode closure section can be effectively missed on a heat transfer object, the temperature of an electrode closure section tip and a reflecting mirror can be lowered, and oxidation of the lead wire of molybdenum and the crack of a reflecting mirror can be prevented.

[0008] Therefore, by this invention, even if it makes a long duration arc tube turn on, the projection mold display which carried out long duration maintenance of a bright screen and the high display quality is attained.

[0009]

[Example]

(Example 1) Drawing 1 is the sectional view showing one example of the metallic-fumes electric-discharge lamp of this invention, and the reflecting mirror with which the heat transfer object with which in 10 a wolfram electrode and 13 were carried out at Mo foil, and metallic-fumes electroluminescence tubing and 11 carried out fixed adhesion of 14 at metallic-fumes electroluminescence tubing, the pinch seal section in which 15 seals a reflecting mirror, and 16 coated external lead wire, and 17 coated the multilayer interference film (un-illustrating), and 18 are crevices.

[0010] First, the manufacture approach of metallic-fumes electroluminescence tubing in the example of this invention is shown. Carrying out the flow of the inert gas to the interior of the glass tube (the bore of 10mm, thickness of 2mm) which consists of quartz glass, flame processing was carried out for about 50 seconds with propane oxygen flame, and it was made the shell of a predetermined configuration with metal mold.

[0011] Thus, the metal mold processed so that a crevice 18 could be formed where the electrode which becomes the acquired glass tube object from a wolfram electrode 11 and the Mo foil 13 is inserted performed the pinch seal. Iodation neodium (NdI3) 3.0mg, iodation dysprosium (DyI3) 6.0mg, 6.0mg (CsI) of cesium iodides, and (Mercury Hg) 40mg were enclosed with argon gas into it, and the metallic-fumes electroluminescence tubing 10 which carried out the chip seal in the chip seal section (un-illustrating) and which was shown in drawing 1 was completed. Thus, when the lighting trial of the produced metallic-fumes electroluminescence tubing 10 was performed, lamp voltage was 95V and the lamp current was 2.6A.

[0012] The mimetic diagram in which drawing 2 (a) shows one example of metallic-fumes electroluminescence tubing of this invention, the sectional view in which (b) shows section-A-A' of metallic-fumes electroluminescence tubing, and (c) are the mimetic diagrams showing the heat transfer object 14 which fits into metallic-fumes electroluminescence tubing, and 19 is the heights of the heat transfer object 14. In the pinch seal section 13, the configuration which showed in (c) the heat transfer object 14 which consists of stainless steel so that a crevice 18 may be formed so that it may become parallel to the Mo foil 13, as shown in (b), and it may fit into this crevice 18 and it may stick to the pinch seal section was processed.

[0013] Fitting of the crevice 18 of the metallic-fumes electroluminescence tubing 10 and the heights 19 of the heat transfer object 14 was carried out, and fixed adhesion of the metallic-fumes electroluminescence tubing 10 and the heat transfer object 14 was carried out. A reflecting mirror 17, the metallic-fumes electroluminescence tubing 10, and the heat transfer object 14 were fixed further, and the metallic-fumes electric-discharge lamp which built metallic-fumes electroluminescence tubing 10 like drawing 1 into the reflecting mirror was produced. In addition, the reflecting mirror 17 coated the front face of a reflecting mirror glass in the configuration of paraboloid of revolution with the multilayer interference film (un-illustrating), and omitted the infrared radiation and ultraviolet rays which are emitted from the metallic-fumes electroluminescence tubing 10, and only the light made it reflect them.

[0014] The metallic-fumes electroluminescence tubing 10 was made to turn on perpendicularly with the arc length of 7mm. When the metallic-fumes electric-discharge lamp made as an experiment was made to turn on by the square wave with a lighting frequency of 250Hz, total luminous flux was about 16000 lm(s), and the color temperature of all was about 7300K. Moreover, as a result of inserting a thermocouple between the metallic-fumes electroluminescence tubing 10 and the heat transfer object 14 and measuring the temperature of the pinch seal section 15 near the external lead wire 16, it was about 350 degrees C. And after turning on the metallic-fumes electric-discharge lamp of this invention for 10000 hours, neither oxidation of the external lead wire 16 of molybdenum nor the crack of a reflecting mirror had happened. On the other hand, when a reflecting mirror 17 was made to fix the metallic-fumes electroluminescence tubing 10 same as an example of a comparison only into cement, there were about 400 degrees C of temperature of the pinch seal section 15 near the external lead wire 16. And the crack occurred in the reflecting mirror 17 in 7000 hours, and the external lead wire 16 of molybdenum was oxidized and disconnected in 8000 hours.

[0015] Drawing 3 is the mimetic diagram showing the projection display in the example of this invention. It

was condensed by the collimator lens 23, the dichroic mirror 24 separated into three colors of blue (B), green (G), and red (R), and incidence of the beam of light 22 of the light source 21 which consists of a metallic-fumes electric-discharge lamp of this invention was carried out to each liquid crystal light valve 25. The image of BGR obtained from the liquid crystal light valve 25 of three sheets was compounded on the screen 27 using the projection lens 26 of three wide angles, respectively, and the full color image was acquired. In the case of the projection display incorporating the metallic-fumes electric-discharge lamp of this invention, the projection mold display of each screen brightness which is 240 ft-L and has neither oxidization of lead wire nor the crack of a reflecting mirror 10000 hours after and which carried out long duration maintenance of a bright screen and the high display quality was attained.

[0016] (Example 2) Carrying out the flow of the inert gas to the interior of the glass tube (the bore of 10mm, thickness of 2mm) which consists of high silica glass, flame processing was carried out for about 20 seconds with hydrogen-oxygen flame, and it was made the shell of a predetermined configuration with metal mold.

[0017] Thus, where the electrode made from a tungsten is inserted into the acquired glass tube object, it stopped. 10mg [of sodium iodides] (NaI) and iodation thallium (TlI) 1mg, iodation indium (InI) 0.6mg, and (Mercury Hg) 50mg were enclosed with argon gas into it, and the metallic-fumes electroluminescence tubing 10 which carried out the chip seal in the chip seal section (un-illustrating) and which was shown in drawing 3 was completed. Thus, when the lighting trial of produced metallic-fumes electroluminescence tubing was performed, lamp voltage was 105V and the lamp current was 2.38A.

[0018] The mimetic diagram in which drawing 4 (a) shows one example of metallic-fumes electroluminescence tubing of this invention, the sectional view in which (b) shows cross-section BB' of metallic-fumes electroluminescence tubing, and (c) are the mimetic diagrams showing the heat transfer object 14 which fits into the electrode sealing section of metallic-fumes electroluminescence tubing, and 19 is the heights of the heat transfer object 14, and they fit into the crevice 18 of the electrode sealing section. The pinch seal of the crevice of the electrode sealing section was carried out so that it might intersect perpendicularly with Mo foil (it is equivalent to the side face of the electrode sealing section), and it formed the crevice 18, and used the alumina as a heat transfer object 14.

[0019] Fitting of the crevice 18 of the metallic-fumes electroluminescence tubing 10 and the heights 19 of the heat transfer object 14 was carried out, and fixed adhesion of the metallic-fumes electroluminescence tubing 10 and the heat transfer object 14 was carried out. The reflecting mirror 17 and the heat transfer object 14 were fixed with the screw, and the metallic-fumes electric-discharge lamp which built metallic-fumes electroluminescence tubing 10 like drawing 3 into the reflecting mirror was produced. In addition, the same thing as an example 1 was used for the reflecting mirror 17.

[0020] In addition, the metallic-fumes electroluminescence tubing 10 was made to turn on perpendicularly with the arc length of 7mm. When the metallic-fumes electric-discharge lamp made as an experiment was made to turn on by the square wave with a lighting frequency of 250Hz, as a result of total luminous flux's being 23000lm(s), and a color temperature's being about 5100K, and all inserting a thermocouple between the metallic-fumes electroluminescence tubing 10 and the heat transfer object 14 and measuring the temperature of the pinch seal section 15 near the external lead wire 16, it was about 360 degrees C. And after turning on the metallic-fumes electric-discharge lamp of this invention for 10000 hours, neither oxidation of the external lead wire 16 of molybdenum nor the crack of a reflecting mirror had happened. On the other hand, when a reflecting mirror 17 was made to fix the metallic-fumes electroluminescence tubing 10 same as an example of a comparison only into cement, there were about 400 degrees C of temperature of the pinch seal section 15 near the external lead wire 16. And the crack occurred in the reflecting mirror 17 in 7500 hours, and the external lead wire 16 of molybdenum was oxidized and disconnected in 8300 hours.

[0021] The metallic-fumes electric-discharge lamp of this invention was built into the projection display like the example 1. In the case of the projection display incorporating the metallic-fumes electric-discharge lamp of this invention, the projection mold display of each screen brightness which is 230 ft-L and has neither oxidization of lead wire nor the crack of a reflecting mirror 10000 hours after and which carried out long duration maintenance of a bright screen and the high display quality was attained.

[0022] (Example 3) The same metallic-fumes electroluminescence tubing 10 and same reflecting mirror 17 as an example 2 were used. Fin 14a for heat dissipation was prepared in the heat transfer object 14 which fits into the electrode sealing section of metallic-fumes electroluminescence tubing, and brass was used for it as the quality of the material.

[0023] Fitting of the crevice 18 of the metallic-fumes electroluminescence tubing 10 and the heights 19 of the heat transfer object 14 was carried out, and fixed adhesion of the metallic-fumes electroluminescence tubing 10 and the heat transfer object 14 was carried out. The reflecting mirror 17 and the heat transfer

object 14 were fixed into cement, and the metallic-fumes electric-discharge lamp which built metallic-fumes electroluminescence tubing 10 like drawing 5 into the reflecting mirror was produced. When the light was switched on on the same conditions as an example 2, as a result of inserting a thermocouple between the metallic-fumes electroluminescence tubing 10 and the heat transfer object 14 and measuring the temperature of the pinch seal section 15 near the external lead wire 16, it was about 330 degrees C. And after turning on the metallic-fumes electric-discharge lamp of this invention for 10000 hours, neither oxidation of the external lead wire 16 of molybdenum nor the crack of a reflecting mirror had happened.

[0024] The metallic-fumes electric-discharge lamp of this invention was built into the projection display like the example 1. In the case of the projection display incorporating the metallic-fumes electric-discharge lamp of this invention, the projection mold display of each screen brightness which is 230 ft-L and has neither oxidization of lead wire nor the crack of a reflecting mirror 10000 hours after and which carried out long duration maintenance of a bright screen and the high display quality was attained.

[0025] (Example 4) The same metallic-fumes electroluminescence tubing 10 and same reflecting mirror 17 as an example 2 were used. Air hole 14b was prepared in the heat transfer object 14 which fits into the electrode sealing section of metallic-fumes electroluminescence tubing, and nickel was used for it as the quality of the material.

[0026] Fitting of the crevice 18 of the metallic-fumes electroluminescence tubing 10 and the heights 19 of the heat transfer object 14 was carried out, and fixed adhesion of the metallic-fumes electroluminescence tubing 10 and the heat transfer object 14 was carried out. The reflecting mirror 17 and the heat transfer object 14 were fixed with the screw (un-illustrating), and the metallic-fumes electric-discharge lamp which built metallic-fumes electroluminescence tubing 10 like drawing 6 into the reflecting mirror was produced. When the light was switched on on the same conditions as an example 2, as a result of inserting a thermocouple between the metallic-fumes electroluminescence tubing 10 and the heat transfer object 14 and measuring the temperature of the pinch seal section 15 near the external lead wire 16, it was about 330 degrees C. And after turning on the metallic-fumes electric-discharge lamp of this invention for 10000 hours, neither oxidation of the external lead wire 16 of molybdenum nor the crack of a reflecting mirror had happened.

[0027] The metallic-fumes electric-discharge lamp of this invention was built into the projection display like the example 1. In the case of the projection display incorporating the metallic-fumes electric-discharge lamp of this invention, the projection mold display of each screen brightness which is 230 ft-L and has neither oxidization of lead wire nor the crack of a reflecting mirror 10000 hours after and which carried out long duration maintenance of a bright screen and the high display quality was attained.

[0028] In addition, in the metallic-fumes electric-discharge lamp of this invention, and a projection mold display, the configuration or enclosure object of metallic-fumes electroluminescence tubing, the amount of enclosure, the existence of a getter, the fixed approach to the reflecting mirror of metallic-fumes electroluminescence tubing and a heat transfer object, the location of coating of the multilayer interference film to a reflecting mirror, a configuration, a display principle of a projection display, etc. are not limited to this example.

[0029]

[Effect of the Invention] As explained above, the metallic-fumes electric-discharge lamp of this invention, and a projection mold display As a metallic-fumes electric-discharge lamp, in the closure section between metallic-fumes electroluminescence tubing with a crevice, and the reflecting mirror which the multilayer interference film coated By carrying out adhesion immobilization at metallic-fumes electroluminescence tubing, and establishing the heat transfer object which consists of a right conductor with said crevice and the heights which fit in The heat at the tip of the electrode closure section can be effectively missed on a heat transfer object, the temperature of an electrode closure section tip and a reflecting mirror can be lowered, and oxidation of the lead wire of molybdenum and the crack of a reflecting mirror can be prevented.

[0030] Therefore, by this invention, even if it makes a long duration arc tube turn on, the projection mold display which carried out long duration maintenance of a bright screen and the high display quality is attained.

[Translation done.]

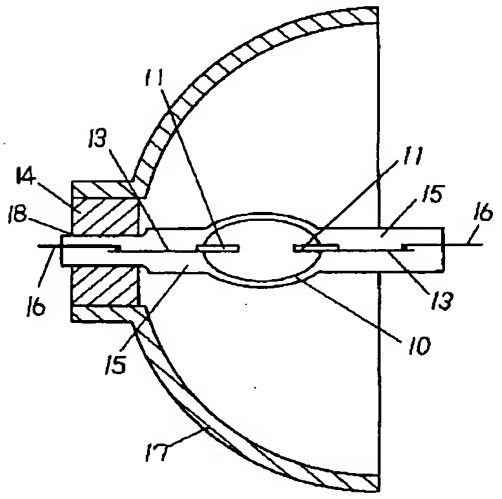
* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

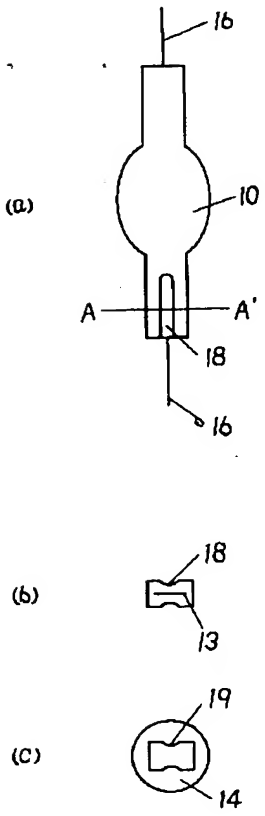
DRAWINGS

[Drawing 1]

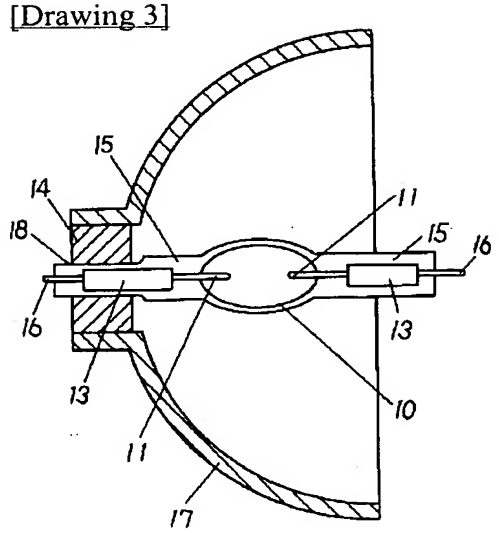
10 金属蒸気放電発光管
11 タングステン電極
13 Mo箔
14 伝熱体
15 ピンチシール部
16 外部リード線
17 反射鏡
18 凹部



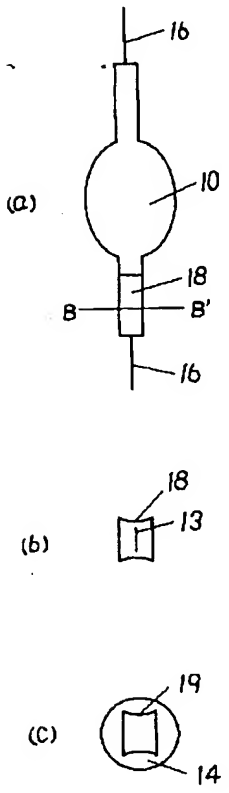
[Drawing 2]



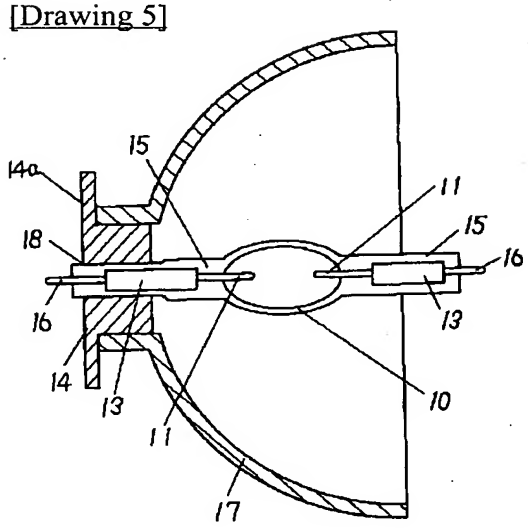
[Drawing 3]



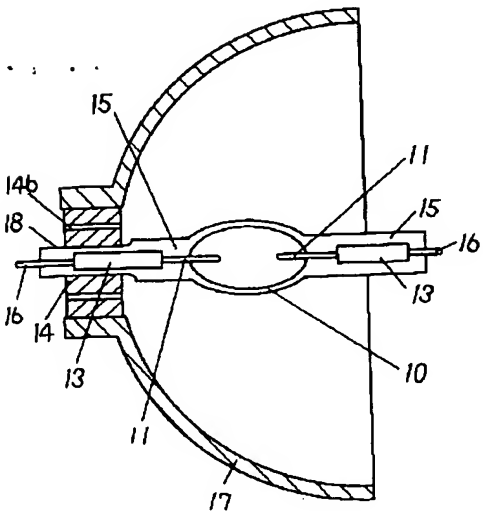
[Drawing 4]



[Drawing 5]

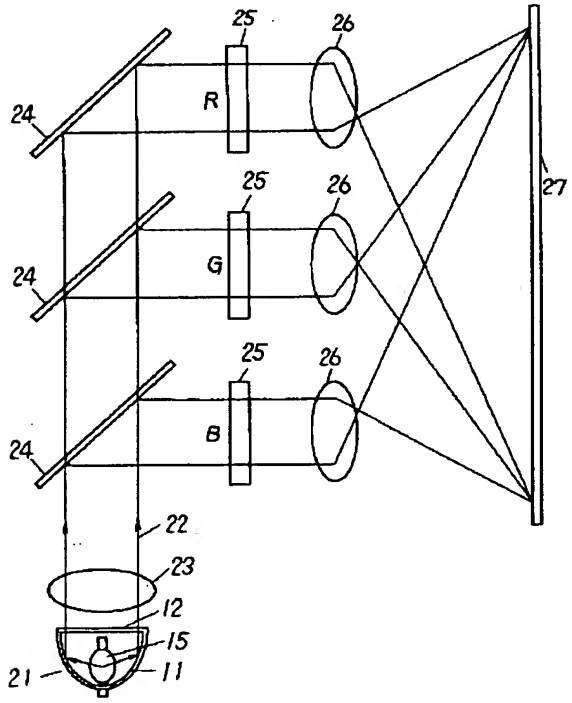


[Drawing 6]



[Drawing 7]

21 光源
24 ダイクロイックミラー
25 液晶ライトバルブ
27 スクリーン



[Translation done.]